208 Forestry Bldg., C.S.C.
Fort Collins, Colorado
October 15, 1942

To: Dr. F. C. Craighead, In Charge, Forest Insect Investigations

From: N. D. Wygant, Entomologist, Fort Collins, Colorado

Subject: Insect Control Survey Report, Wasatch N.F., by Mr. Bruce V. Groves

Enclosed is a copy of the survey report on the Wasatch National Forest by Mr. Bruce V. Groves. Only one copy was sent to me and I have prepared a copy here at Fort Collins for your information. This has caused a delay in forwarding it to you with my comments.

The survey was completed the day that I left Utah and the results were discussed with Messrs. Groves, Robb, and Miles and the recommendations agreed upon before I left. Therefore, I am in agreement with the recommended plan of action as outlined in Mr. Groves' report.

As you will note in the report, the one-man line plot method was used this year instead of the line of 1 chain wide as used in the past. The line plot system seems to be easier for inexperienced men to learn and I believe that it has worked out very well and is especially adaptable to lodgepole pine stands where the stand is dense and the terrain rough. The 1/4-acre plots consist of a circular area with a 59 foot radius.

I was out with the survey crew several days and had an opportunity to see much of the area and examine the brood conditions in some of the trees. The survey crew was advised to examine quite thoroughly all the trees found on their plots because it was noted that strip attacks and attacks of decadent trees were quite common on the Broadhead-Haystack unit where the survey was started. Mr. Groves has separated the strip-attacked trees from the full attacked trees in his summary of estimated number of new attacks. As many strip-killed trees were found on the Broadhead-Haystack, Iron Mine, and Mirror Lake units as fully attacked trees. This relation did not hold in the heavily infested units--Fish Creek or Rock Creek. An examination of a number of trees marked on the survey last year revealed that many of the trees were strip-killed and produced little brood and did not need treatment. This probably resulted in an over-estimate in certain units on the 1941 survey.

The insect situation on the Wasatch is now cornered and every effort should be made to clean up the remaining units this coming fall and spring. The survey indicates a big reduction in the 1942 attacks and in view of heavy brood that was found on Rock Creek and Fish Creek units and the unusually 1942 dry season the epidemic can easily build up again in 1943. The spring of 1942 on the Wasatch was wet and late but the summer and fall was very dry and warm temperatures prevailed up to the time that I left on October 5. The adults emerged late but the warm late summer and early fall temperatures permitted the larvae to reach their normal stage of development before winter dormancy set in.

In the recommended plan of action Mr. Groves has set up the Broadhead-Haystack unit as priority No. 7. In view of the very scattered infestation covering a large area it is doubtful if it is feasible to do control work in that area, particularly in view of the labor shortage. The cost per tree would also run very high.

A record was kept on the number of 1941 attacked trees and Mr. Groves gives the estimated number red tops in his summary. Past experience has shown that the year a tree was attacked cannot be accurately determined once the tree has been abandoned by the insects. Therefore the accuracy of this estimate is questionable.

The cost per tree in the Fish Creek and Rock Creek units is going to run high even though the infestation is concentrated because the control camps will be 5 to 10 miles from the end of the road making it necessary to use pack animals and also because the terrain is very rough. The slopes are so steep and rocky that ortho cannot be used because horses cannot be used to pack the oil to the trees to be treated. This means that treating will have to stop as soon as the fire hazard becomes severe next spring. The trees in these units are small and the logs can be readily decked by hand for burning.

Briefly, then, the plan of action is to move unto the Fish Creek and Rock Creek units as soon as possible and work as late as the weather will permit and then resume operations as early as possible in the spring. After the fire hazard is too great to burn next spring, the Iron Mine unit can be cleaned up with the use of ortho and diesel oil.

It will be some time before the surveys on the Powell and Dixie National Forests are completed; therefore, it seems advisable to make a request of funds for the Wasatch job at the present time. I understand that it is customary to submit the requests for funds after all the surveys are completed, but in this instance it seems advisable to get the job started on the Wasatch as soon as possible.

Mr. Groves has very clearly presented the situation on the Wasatch and no further comment is necessary.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
WASATCH NATIONAL FOREST

ADDRESS REPLY TO
FOREST SUPERVISOR
AND REFER TO

SALT LAKE CITY, UTAH

S
CONTROL-Wasatch
Insect

October 12, 1942

To: Dr. N. D. Wygant, Entomologist, Fort Collins, Colorado

From: Bruce V. Groves, Acting Forest Supervisor

Subject: Insect Control Survey Report

Enclosed is a copy of our completed report, with my recommendations for the years work, and map showing areas surveyed.

Except for the Fish Creek unit, I have not discussed my recommendations with Mr. Robb or Mr. Miles, an d then only by telephone, so I do not know whether they would be in full agreement or not.

We plan to start work in Fish Creek as soon as a crew can be completed.

Bruce V. Groves

Dr. Wygant

S
CONTROL - Wasatch
Insect
(Annual Survey and Infestation Report)

Salt Lake City, Utah
October 12, 1942

To: Regional Forester

From: James E. Gurr, Forest Supervisor

Subject: Annual Survey and Infestation Report

Attached are four copies of our annual insect control survey report, combined with the infestation report. Two copies of a map showing areas surveyed and areas recommended for treatment are also enclosed.

We are mailing a map and a copy of the report direct to Dr. Wygant, as suggested in Mr. Groves' conversation with Mr. Miles last week.

J. E. G.

JAMES E. GURR

8
CONTROL - Wasatch
Insect
(Annual Survey and Infestation Report)

Salt Lake City, Utah
October 12, 1942

To: Forest Supervisor

From: Bruce V. Greves, Assistant Forester

Subject: Annual Insect Control Survey and Infestation Report

During the period September 16 to October 5 a four man crew under the writer's direction surveyed eleven units in the Provo River, Grandaddy Lakes, and Blacksfork areas to determine the number and location of lodgepole pine trees infested with the mountain pine beetle, Dendroctnus monticola.

Two days were devoted to training in survey mechanics and evaluation of insect brood condition in individual trees. Dr. Wygant of the Bureau of Entomology gave valuable advice and assistance in the training, and outlined the data to be collected.

None of the temporary men hired had previous survey experience. Two men who had been counted on to reduce the time required to survey the areas were unable to go at the last moment.

Advance reconnaissance allowed considerable unit acreage to be eliminated from the survey which covered 45,525 acres.

The Grandaddy Lakes area was surveyed from pack camps established at Rainbow Lake, Squaw Basin and the head of Rock Creek. Lack of forage prevented using campsites in the center of Rock and Fish Creek units as had been customary in the past. Horses were utilized by surveypors to reach distant portions of these units from the above camps.

Methods

The one-man line plot method was used this year instead of the strip method. The survey was run generally on a 2½ per cent basis, 1/4 acre plots being surveyed every 2½ chains, using 40 chain offsets. When inconclusive results were indicated from the posted data, additional plots were run between those already mapped, making a 5% survey for that part of the unit. Survey mechanics were greatly simplified on units having previously established baseline stations which made the search for section corner ties unnecessary.

Each surveyor was provided with a staff with red flagging, which he used to supplement pacing on steep slopes, and as a flag to designate the center of his plots.

It is believed that the plot method offers several advantages:

1. More accurate pacing and compass work is possible because surveyors need not watch for infested trees between plots.

2. A more accurate check on trees is expected because surveyors need not be concerned with pacing and compass bearing.

3. A more accurate designation of the exact boundary of area to be surveyed is probably obtained, since the center of the plot is ordinarily determined before trees are checked and plot radius may easily be paced when an occasional infested tree is found close to the plot boundary. The strip method tended to have a rather fluid center line since the surveyor had to cover the entire strip width to check on trees. It is probable that the presence of red tops or new attacks might influence his decision as to its exact center, since he often did not determine the center line until after finding the infested tree.

It is possible that some speed is sacrificed by those inexperienced in the use of the compass. But this should be compensated by the faster travel possible between plots than is possible on strip survey.

By carrying a tally register and recording cumulative total paces, but mentally counting paces between plots, it is possible to check systematically each plot by pausing when the mental count reaches its outer perimeter to designate this with a foot mark and check carefully on adjacent trees from there to the plot center. Then an excursion should be made to each side of the center flag if trees are present, and a check made of remaining trees on line from plot center, forward, as the compass bearing is followed to the next plot. This procedure requires a minimum of travel within the plot, which is important on steep slopes, yet allows the plot radius to be paced on opposite sides without extra effort when the tree locations warrant.

Costs

The approximate cost of the survey follows:

Labor	$360.90	
Transportation:		
Automobile	16.92	
Horse hire	43.00	
Horse feed	20.00	
F. O. travel & expense	25.00	(Groves and Swapp)
Subsistence	100.00	
Miscellaneous	15.00	
Total	$580.82	

Total	$580.92	
Contributed time	144.00	F. C. on actual survey
	$724.82	

Results and Recommendations

The table below summarizes the estimates and action taken since the present Wasatch infestation was recognized in 1939.

Insect Breed Year	Estimated New Attacks	Number trees Treated
1938 - 1939	*18,050	0
1939 - 1940	24,400	9,004
1940 - 1941	45,666	17,645
1941 - 1942	40,717	23,184
1942 - 1943	12,549	
Total	141,382	49,833

*1939 Red Top Estimate

Results of the current survey show that the past control work and abnormal weather conditions in 1941 and spring 1942 have combined to reduce the total infestation and rate of re-attack on untreated units.

This summer and fall has had considerably less precipitation than in 1941 and points to a probable increased emergence from next year's brood, if spring weather is normal, wherever control work does not intervene.

Slightly more than half of the work done last year should control remaining infested areas if done this winter and next spring. This should be the objective for the year's work. Greatest difficulty, if funds are provided, will be to obtain labor, especially for overhead positions. The cost per tree will no doubt be higher due to increased subsistence, equipment and labor costs.

This year's survey uncovered the fact that many of last year's attacks were strip kills--did not kill the tree. Therefore, red top count does not give a true picture of the actual situation last year. A separate estimate of strip kill attacks was therefore made. Also, any trees having attacks not definitely successful yet possibly not pitchouts, that is, "doubtful" trees, were so recorded and are included as such in the estimate.

Survey results are discussed below, by units:

Iron Mine - A total of 13,439 trees were treated on this unit during the past year's work. This number is about 22 per cent less than last year's

survey had indicated. It is felt probable that all estimates last year were high due to the large number of pitched out attacks prevalent on areas, as noted during this survey and by checks on trees marked by surveyors last year. Late flight, occurring just previous to last year's survey, made difficult correct determination as to whether attacks were successful.

The new survey indicates 868 re-infested trees on this unit, or a reduction of about 94 per cent. However, it is estimated that 640 of this total is on an area of about 2500 acres, or about .25 trees per acre, making further clean-up imperative. Of the estimated 263 red tops found, 132 still contained hold-over brood that may require treating if flight does not occur before control is completed. More than half of the new attacks were strip kills and possible "pitch outs" which lessens the actual intensity of the infestation. Most of the new attacks on plots occurred in the vicinity of red tops, indicating that poor spotting is responsible for the new attacks. Often these red tops were trees which had previous year's strip kills. They had been examined by spotters but passed up as having no brood. New strip attacks were sometimes missed entirely. Such trees are usually re-infested this year on the green side. All Iron Mine spotting was done during the fall of 1941, in snow. Greatest reinfestation was in the area spotted during September and October shortly after flight occurred.

It is recommended that clean-up measures be taken as early as feasible next spring, using the ortho-spray method. Estimates of total ortho needs will be made soon and an attempt made to obtain funds for its purchase.

Broadhead-Haystack - This large unit, having .19 trees per acre last year, was untreated due to lack of funds. The current estimate of 1480 trees or .12 per acre shows a large reduction from the previous estimate. Also 880 trees of this estimate are strip kills and some possible pitch outs. The trend of the infestation is down. However, 1080 trees of the above estimate are present on 6208 acres or .17 new attacks per acre. Because of the weak character of more than half of the attacks, treatment is not recommended on this area until assurance of completing higher priority units is obtained (See Unit Summary of Estimates). Also, weather conditions next spring will influence this recommendation. If an early or dry spring, favorable to brood development, occurs, treatment should be instituted to prevent a flare-up in this over-mature stand. Large size of the trees and the scattered infestation will make this an expensive job.

Mirror Lake - Epidemic conditions prevail on two areas of this unit. About 100 trees should be treated in the vicinity of Pyramid Lake and Echo Lake. A small crew camped at the end of an old Broadhead logging road should treat these trees by decking and burning early in the spring. It is impractical to try to reach this area with horses from the south due to large slide rock and cliffs which eliminate consideration of the ortho-spray method.

The other area between the East Fork and North Fork of Duchesne should be treated with ortho as soon as the Mirror Lake road is opened. An estimated 280 trees are on this area, which was treated with ortho in the spring of 1941, showed a reinfestation last year, but which went untreated.

Norway Flats - This unit is characterized by scattered mature type broken up by larger areas of reproduction, aspen and rock cover types. The mature type is infested with .20 trees per acre. The total of 64 trees per acre is not recommended for treatment until higher priority stands are thoroughly cleaned up because it is inaccessible timber and does not constitute a great threat to other stands.

Fish Creek - Abnormally late springs in 1941 and 1942 have evidently caused a decrease in this unit estimate to 1974 trees, or from 1.09 trees per acre to .47. Plotted new attacks show that the infested area is moving northward, threatening the Grandaddy Lakes Basin unit which is as yet comparatively clean but made up of overmature type similar to that on the Iron Mine unit. Preventive treatment is urgently needed on the Fish Creek unit in order to protect the upper basin. New attacks on Fish and Rock Creeks are generally hard and difficult to spot. A much lower proportion of strip attacks were noted than on other units. Unless it is controlled, an increase in next year's infestation is definitely predicted if we have normal spring weather.

It is, therefore, recommended that spotting and treating commence immediately. Since most of the unit cannot be reached by horses due to the very steep and rocky slopes, decking and burning by hand is the only practical control method other than peeling. The trees are generally smaller than on other units but in order to complete the job before fire weather in the spring, work must be carried on this winter. Depth of snow at the upper end of treater's strips will limit the time which treating and spotting can be carried on, since it would be impractical to return in the spring to complete treatment on the ridge tops. Long truck hauls on poor roads and long pack jobs for equipment and supplies are major difficulties of either winter or spring work on Fish and Rock Creek units.

Rock Creek - This unit constitutes the largest and most intensive infestation remaining on the Wasatch. The 6,825 trees estimated this year represent a decrease of from 1.46 trees per acre to .91.

Although higher priority for treating belongs to Fish Creek unit, all other considerations and descriptions apply as well to this unit and treating is recommended if sufficient labor can be obtained.

Hades - Treating is recommended on this unit if higher priority units are assured of treatment. The surveyed area indicates a heavy infestation but it probably is not a great threat to the Grandaddy Lakes area due to intervening spruce, fir and rock types, and the high ridge between the units. More strips were run in the steep and rocky canyon than is shown in the summary, but since no new attacks were encountered, they were eliminated. If

work is done, however, considerable more trees will be found above the surveyed type shown in scattered mature pine located in small pockets and separated by spruce and rock cliffs. It would be difficult to estimate the correct number but red tops visible and some heavy new attacks along the trail indicate a guess of 200 more trees to treat in the canyon extending two to three miles above the surveyed type. An accurate survey is impractical due to cliffs and scattered character of the trees. Treating will, of course, be difficult and costly.

Corral Creek - This small unit has definitely decreased in intensity by half, yet still has epidemic conditions. It is an inaccessible stand and does not constitute a threat to other areas. Treatment is recommended after higher priorities are met.

Timber on the unit is quite large and overmature.

Squaw Basin - The survey discloses that this infestation, which flared last year, has relapsed to an endemic condition. The timber in this basin is a younger stand having no break or barrier between it and the adjacent Rock Creek unit, which threatens it. No control is required.

Grandaddy Lakes - This large overmature stand has considerable dead timber in it, indicating past uniformally scattered infestations of greater intensity than the very scattered present endemic attacks. They are more frequent this year, though, and there is evidence of increased activity in the south part of the unit adjacent to Fish Creek unit. No treatment is required.

Lower East Fork - Treatment of about 80 trees near the forest boundary should be undertaken next spring.

Other Blacksfork units--Smith Fork, Middle Fork, East Fork and West Fork--treated in the spring of 1941, have been observed by extensive reconnaissance and seem very clean. Only a few scattered red tops were observed but an intensive check should be made next summer to determine if a survey is needed in the fall of 1943.

SUMMARY

The following attached tables show the survey estimates and control cost estimates, with order of priority shown for units recommended for treatment.

Hold-over attacks are included in cost estimate, though many variable factors will determine whether the hold-over brood condition will warrant treatment.

In view of the inaccessibility of some units, current prices, wage scales and character of labor possibly obtainable, it is thought that the cost estimates are very conservative, possibly too low.

Respectively submitted,

Bruce V. Grover

APPROVED:

_____, Forest Supervisor

SUMMARY OF ESTIMATES - WASATCH INSECT CONTROL SURVEY - 1942

Unit No.	Unit Name	Acres Surveyed	Percent Survey	Estimated Number New Attacks: Full Attacks	Strip Attacks	Possible Pitch Outs	Total	Estimated Number Hold-overs	Estimated Number Red Tops	New Attacks Per Acre Last Year	New Attacks Per Acre 1942
1	Iron Mine	7,236	3.0	403	366	99	868*	182	263	1.6	.12
2	Broadhead-Hay.	12,048	2.5	600	680	200	1,480	200	1,040	.19	.12
3	Mirror Lake	2,853	3.5	220	160	0	380	20	300	.07	.13
4	Norway Flats	320	4.6	64	0	0	64	0	20	.12	.20
5	Rock Creek	7,500	2.5	6,229	996	0	6,825	298	5,140	1.46	.91
6	Fish Creek	4,200	2.5	1,489	485	0	1,974	180	756	1.09	.47
7	Corral Creek	460	3.5	91	24	0	115	14	257	.58	.25
8	Hades	440	3.2	189	94	0	283	92	283	1.0	.64
9	Squaw Basin	2,380	2.5	120	40	0	160	40	200	.23	.07
10	Grandaddy Lakes	7,268	2.5	200	120	0	320	0	160	.02	.04
11	Lower E. Fork	800	5.0	60	20	0	80	0	80	.02	.10
	TOTAL	45,525		9,665	2,585	299	12,549	1,026	8,499	.61	.28

*13,439 treated last year

RECOMMENDED PLAN OF ACTION - COST ESTIMATES AND UNIT PRIORITIES
WASATCH INSECT CONTROL - 1942

Priority	Unit Number	Unit Name	Estimated No. on Unit			Recommended Control Time and Method	Estimated Cost per tree	Estimated Cost for Unit
			Total N. A.	Hold-overs	Total			
1	1	Iron Mine	868	182	1,050	Spring - Ortho Spray	4.75	5,120
2	6	Fish Creek	1,974	180	2,154	Fall - Deck and Burn	4.50	9,700
3	5	Rock Creek	6,825	298	7,123	Fall & Spring - Deck & Burn	4.50	32,000
4	3	Mirror Lake	380	20	400	Spring - Ortho - D & B	4.75	1,900
5	11	Lower E. Fork	80	0	80	Spring - Ortho	4.50	360
6	8	Hades	483	92	°575	Spring - Deck and Burn	5.25	3,000
#7	2	Broadhead-Hay.	1,480	200	1,680	Spring - Ortho	5.00	8,400
8	7	Corral Creek	115	14	129	Spring - Deck and Burn	5.50	710
9	4	Norway Flats	64	0	64	Spring - Ortho	5.50	352
10	9	Squaw Basin	160	40	200	None	--	--
11	10	Grandaddy Lakes	320	0	320	None	--	--
		TOTAL	12,749	1,026	13,775			$61,542

#Priority 6 if spring weather favors brood development.

°200 trees added to estimate (See narrative report on unit.)

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
EARLE H. CLAPP, ACTING CHIEF
T.W. NORCROSS, CHIEF, DIVISION OF ENGINEERING

WASATCH NATIONAL FOREST
UTAH AND WYOMING
SALT LAKE, SIXTH PRINCIPAL AND UINTA SPECIAL MERIDIANS

1942

SCALE
1 ½ 0 1 2 3 4 5

SUMMARY OF ESTIMATES - WASATCH INSECT CONTROL SURVEY - 1942

Unit No.	Unit Name	Acres Surveyed	Percent Survey	Estimated Number New Attacks: Full Attacks	Strip Attacks	Possible Pitch Outs	Total	Estimated Number Hold-overs	Estimated Number Red Tops	New Attacks Per Acre: Last Year	New Attacks Per Acre: 1942
1	Iron Mine	7,236	3.0	403	366	99	868°	182	263	1.6	.12
2	Broadhead-Hay.	12,048	2.5	600	680	200	1,480	200	1,040	.19	.12
3	Mirror Lake	2,853	3.5	220	160	0	380	20	300	.07	.13
4	Norway Flats	320	4.6	64	0	0	64	0	20	.12	.20
5	Rock Creek	7,500	2.5	6,229	596	0	6,825	298	5,140	1.46	.91
6	Fish Creek	4,200	2.5	1,489	485	0	1,974	180	756	1.09	.47
7	Corral Creek	460	3.5	91	24	0	115	14	257	.58	.25
8	Hades	440	3.2	189	94	0	283	92	283	1.0	.64
9	Squaw Basin	2,380	2.5	120	40	0	160	40	200	.23	.07
10	Grandaddy Lakes	7,288	2.5	200	120	0	320	0	160	.02	.04
11	Lower E. Fork	800	5.0	60	20	0	80	0	80	.02	.10
	TOTAL	45,525		9,665	2,585	299	12,549	1,026	8,499	.61	.28

°12,439 treated last year

LEGEND

1 Unit Number

Unit Boundary

////// Area recommended for Treatment